

AMENDMENTS TO THE DRAWINGS

Amendments to the drawings are on the attached replacement sheet 1/4 as follows.

A cross-section of a trace and a corresponding reference number 170 are added to Fig. 1.

REMARKS

Claims 1-19 were pending in the above-identified patent application and stand rejected. The rejection was made final. Pursuant to 37 C.F.R §1.116, Applicants request entry of the above amendments to the specification and drawings to comply with requirements of form set forth in the Final Office Action and to place the application in a better form for appeal.

The Final Office Action contained an objection to the drawings as failing to show every feature in the claims. In particular, the Examiner indicated that the drawings failed to show “a die mounted on the sub-mount and containing an edge-emitting laser that is electrically coupled to the conductive traces.” In response, Fig. 1 is amended to show traces designated with reference number 170, and the specification is amended to use the reference number 170. Accordingly, Fig. 1 of the drawings shows a die 110 mounted on sub-mount 120 and containing an edge emitting laser that is electrically coupled to conductive traces 170. No new matter is added by the amendment to the drawings or specification because original paragraph [0024] of the specification referred to traces as a not-shown element of Fig. 1 and Fig. 3A specifically illustrates conductive traces 340 as part of an embodiment of the sub-mount such as illustrated in Fig. 1. In view of the amendment to Fig. 1, Applicants request reconsideration and withdrawal of the objection to the drawings.

Claims 1, 6, 7, 10, 14, 17, and 18 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Pat. No. 5,883,988 (Yamamoto). Applicants respectfully traverse the rejection.

Independent claim 1 distinguishes over Yamamoto at least by reciting, “a die mounted on the sub-mount and containing an edge-emitting laser that is electrically coupled to the conductive traces; and a reflector positioned to reflect an optical signal from the edge-emitting laser through the sub-mount.” Yamamoto fails to disclose or suggest mounting a die containing a laser on a sub-mount that includes electrical traces for the laser and still permits transmission of an optical signal through the sub-mount.

Yamamoto teaches a system where light entering a device substrate 3 is absorbed in ohmic electrodes 8b of a photoreception device. For example, in Fig. 4A, a photoreception device 401 mounted on a support substrate 1 receives light from a waveguide 13 into photoreception device 401. The light is **refracted** (not reflected) at a surface of device substrate 3. Fig. 4A does not show an edge emitting laser, but wave

guide 13, like device substrate 3, is mounted on support substrate 1. Even if the disclosure of Yamamoto were extrapolated to suggest that a side emitting laser could be mounted on support substrate 1, Yamamoto fails to suggest reflecting light through support substrate 1, and Yamamoto fails to disclose or suggest mounting a die including a laser on device substrate 3. Accordingly, claim 1 is patentable over Yamamoto.

Claims 6, 7, and 18 depend from claim 1 and are patentable over Yamamoto for at least the same reasons that claim 1 is patentable over Yamamoto.

Claim 6 further distinguishes over Yamamoto by reciting, "the reflector comprises a portion of an inner wall of a cavity in a cap overlying the die." Yamamoto fails to disclose or suggest a cap or a lid having a wall that acts as a reflector. In regard to a cap, the Examiner cites Figs. 6, 10, 11, 19, 21, 24, and 25 and element 15. Yamamoto refers to a reflective coating 15 but nowhere does Yamamoto refer to or suggest coating 15 as being part of a cap overlying a die. In particular, in each of Figs. 6, 10, 11, 19, 21, 24, and 25, reflective coating 15 is on a device substrate that is adjacent to (not overlying) a wave guide 13. Further, a die containing an edge-emitting laser, which may be an environmentally delicate device, is no where shown in any of the figures that the Examiner cites in this rejection. Accordingly, claim 6 is clearly patentable over Yamamoto.

Claim 18 further distinguishes over Yamamoto by reciting, "the die is mounted on a first surface of the sub-mount, and the reflector directs the optical signal through the first surface." As noted above, Yamamoto teaches devices mounted on a surface of a support substrate 1 and does not suggest directing light through support substrate 1. Instead, Yamamoto directs light into a device substrate 3, with no light source of any kind being mounted on device substrate 3.

Independent claim 10 distinguishes over Yamamoto at least by reciting, "mounting a die containing a laser on a surface of a sub-mount; electrically connecting the laser to electrical traces in the sub-mount; and attaching a reflector to the sub-mount in a position such that an optical signal from the laser is reflected through the sub-mount." As noted above, Yamamoto teaches directing light into a device substrate containing a photoreception device that absorbs the light. Further, Yamamoto does not suggest mounting a laser on the device substrate into which the light is directed, but instead, Yamamoto teaches mounting on a support substrate which is not used for light flow. Accordingly, claim 10 is patentable over Yamamoto.

Claims 14 and 17 depend from claim 10 and are patentable over Yamamoto for at least the same reasons that claim 10 is patentable over Yamamoto.

Claim 17 further distinguishes over Yamamoto by reciting, "the reflector reflects the optical signal through the surface on which the die is mounted." Yamamoto fails to suggest an optical signal passing through a surface on which a die containing a light source is mounted.

For the above reasons, Applicants request reconsideration and withdrawal of the rejection under 35 U.S.C. § 102.

Claims 2, 11, and 19 were rejected under 35 U.S.C. § 103(a) as unpatentable over Yamamoto in view of U.S. Pat. No. 5,195,156 (Freeman). Applicants respectfully traverse the rejection.

Claims 2 and 19 depend from claim 1, and claim 11 depends from claim 10. As indicated above, independent claims 1 and 10 are patentable over Yamamoto at least because Yamamoto fails to suggest directing an optical signal through a sub-mount on which a light source is mounted. The Examiner cites Freeman as disclosing an alignment post. However, such a disclosure by Freeman would not affect the above reasons for claims 1 and 10 being patentable. Accordingly, independent claims 1 and 10 and dependent claims 2, 11, and 19 are patentable over the combination of Yamamoto and Freeman.

Claim 2 further distinguishes over the combination of Yamamoto and Freeman by reciting, "an alignment post attached to the sub-mount where the optical signal emerges from the sub-mount." Yamamoto fails to disclose or suggest alignment structures. Freeman is directed to an optical fiber connector assembly with no specified relationship to a sub-mount. Yamamoto and Freeman whether considered separately or in combination fail to suggest any alignment structure attached to a sub-mount on which a laser is mounted and particularly fails to suggest an alignment post attached "where the optical signal emerges from the sub-mount" as recited in claim 2.

Claims 11 and 19 further distinguish over the combination of Yamamoto and Freeman by respectively reciting, "attaching an alignment post to the sub-mount where the optical signal emerges," and "an alignment post attached to a second surface of the sub-mount where the optical signal emerges from the sub-mount." As noted in regard to claim 2, Yamamoto and Freeman fail to disclose or suggest an alignment post mounted where an optical signal emerges from a sub-mount on which a laser die is mounted.

For the above reasons, Applicants request reconsideration and withdrawal of this rejection under 35 U.S.C. § 103.

Claims 3-5 were rejected under 35 U.S.C. § 103(a) as unpatentable over Yamamoto. Applicants respectfully traverse the rejection.

Claims 3-5 depend from claim 1 and are patentable over Yamamoto for at least the reasons given above to show that claim 1 is patentable over Yamamoto. Accordingly, Applicants request reconsideration and withdrawal of the rejection under 35 U.S.C. § 103.

Claims 8, 9, 12, and 13 were rejected under 35 U.S.C. § 103(a) as unpatentable over Yamamoto in view of U.S. Pat. App. Pub. No. 2001/0023920 (Ando). Applicants respectfully traverse the rejection.

Claims 8 and 9 depend from independent claim 1, which is patentable over Yamamoto for at least the reasons given above. In particular, Yamamoto fails to suggest mounting a laser on a sub-mount through which the optical signal from the laser is directed. The Examiner cites Ando for disclosing encapsulation of optical devices using transparent material such as silicone. However, such teaching does not provide the elements of claim 1 that are missing from Yamamoto. Accordingly, claims 8 and 9 are patentable over the combination of Yamamoto and Ando.

Similarly, claim 12 and 13, which depend from claim 10, are patentable over the combination of Yamamoto and Ando for at least the same reasons that independent claim 10 is patentable over Yamamoto.

For the above reasons, Applicants request reconsideration and withdrawal of this rejection under 35 U.S.C. § 103.

Claims 15 and 16 were rejected under 35 U.S.C. § 103(a) as unpatentable over Yamamoto in view of U.S. Pat. No. 5,822,352 (Mizutani). Applicants respectfully traverse the rejection.

Claims 15 and 16 depend from claim 10, which is patentable over Yamamoto for at least the reasons given above. In particular, claim 10 recites, "mounting a die containing a laser on a surface of a sub-mount; electrically connecting the laser to electrical traces in the sub-mount; and attaching a reflector to the sub-mount in a position such that an optical signal from the laser is reflected through the sub-mount," and Yamamoto fails to disclose or suggest mounting a die containing a laser on a sub-mount through which an optical signal is directed. The Examiner cites Mizutani for teaching crystal growth of multiple laser structures on a wafer. However, such teaching when considered in combination with Yamamoto does not affect the reasons for the patentability of claim 10. Accordingly, independent claim 10 and dependent claims 15 and 16 are patentable over the combination

of Yamamoto and Mizutani, and Applicants request reconsideration and withdrawal of this rejection under 35 U.S.C. § 103.

In summary, claims 1-19 were pending in the application and remain in the form subject to the final rejection. For the above reasons, Applicants respectfully request withdrawal of the final rejection and allowance of the application including claims 1-19.

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